STAT

COHERENT LIGHT ENLARGER

STAT

12th Progress Report 13 May to 9 June 1964

During the past month, the assembly of the enlarger was to have been completed and check-out started. However, the initial photographic tests performed on the optical system immediately after assembly and alignment revealed serious optical imaging defects. The exact cause of this trouble has not yet been determined despite many hours of testing and inspection. Planning and scheduling from this point on will depend strictly on our success in determining the cause and means of correcting this difficulty.

The optical problem manifests itself as a non-uniformity in resolution over the image field. Resolution at and near the field center is excellent, easily exceeding 250 lines/mm at medium contrast. However, starting at about two degrees off-axis, the image rapidly deteriorates to less than 100 lines/mm, and again improving at certain extreme field positions. The accompanying sketch shows typical results taken from one of the test runs.

Extensive visual testing has shown that the trouble is caused by the projection lens (Lens No. 1), but cannot be identified with any typical aberration. Decentration or glass index inhomogeneities are most suspect at the moment. Tests are proceeding in an attempt to isolate the cause of the trouble.

There are several possibilities:

(1) The tests will uncover a minor fault which can be quickly corrected. The instrument will then be shipped in final configuration. The following could be considered minor faults: Lens element not centered in cell, lens element improperly spaced in cell, figure error correctable by re-polishing.

(2A) The tests will uncover a major fault which cannot be quickly corrected. The instrument could be shipped on the assumption that correction would be effected by retrofit at a future date.

(2B) The tests will uncover a major fault which cannot be quickly corrected. The instrument could remain at [redacted] until correction is effected.

The following would be considered major faults: Lens element found to contain variations in index of refraction (new element required), cell found

to constrain glass and induce distortions (revision required).

Should a major fault be uncovered, the choice between (2A) and (2B) would have to be made by the Customer. The advantage of (2A) is that the Customer could begin to gain operating experience at an earlier date; the disadvantage is that associates of the Customer may conclude he made a poor choice if he cannot demonstrate full-field resolution. The advantage of (2B) is that the Customer will probably have a fully effective instrument at an earlier date due to ease of performing rework here at [redacted]

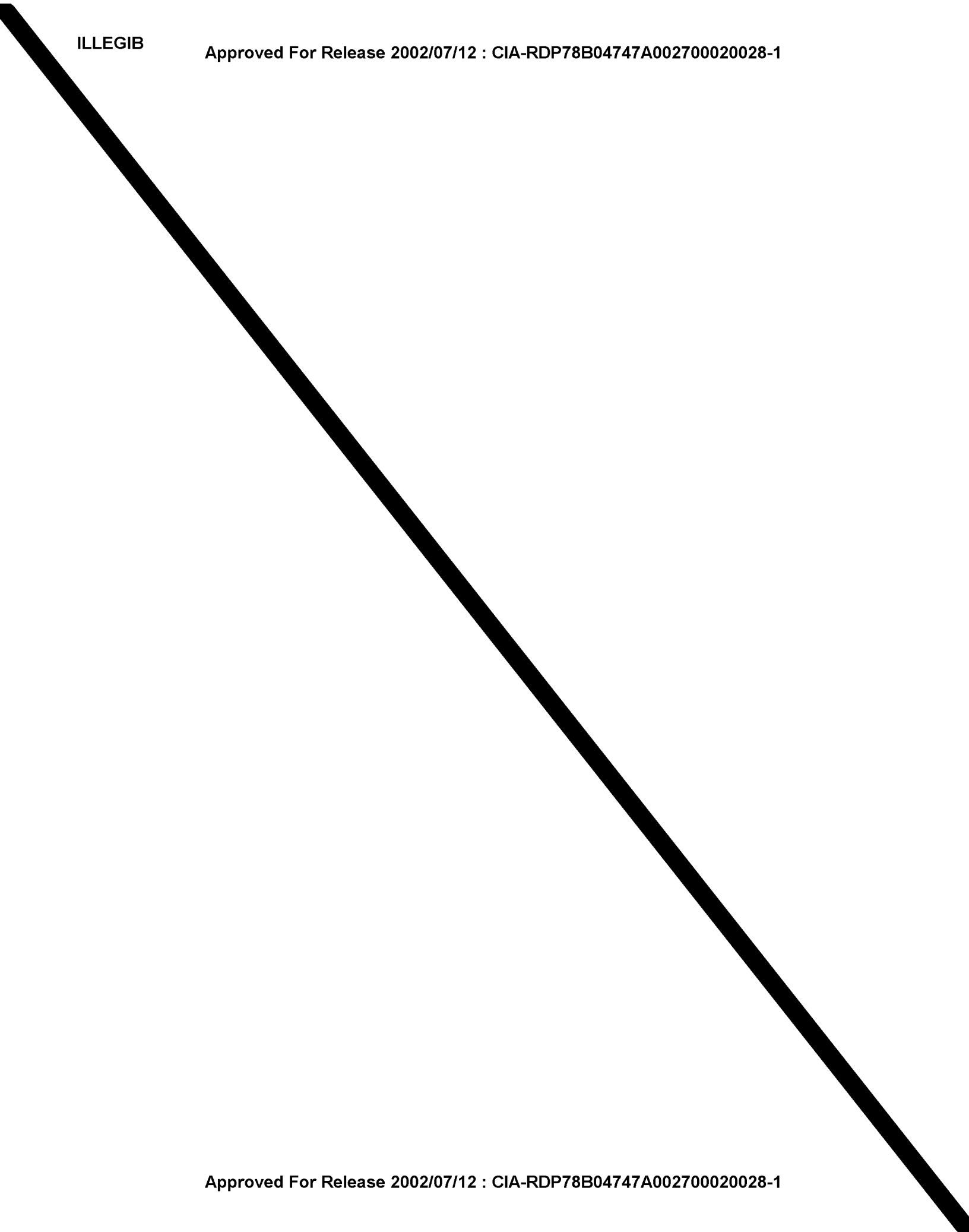
The possibility of faults due to several causes rather than one cause is considered remote since all cells, spacers and lens elements have passed detail inspection with only minor imperfections in evidence.

In the event that a major fault is found, that is, if the particular item causing image degradation is isolated and found to be in need of replacement, and if the Customer elects to have the instrument shipped on a retrofit basis (2A), all other aspects are substantially complete. Shipment could be effected after a brief series of operating tests.

The Customer will be informed of the results of the present tests as soon as they are known.

[redacted] STAT

LC/js



Approved For Release 2002/07/12 : CIA-RDP78B04747A002700020028-1

[redacted]

STAT

COHERENT LIGHT ENLARGER

[redacted]

11th Progress Report 10 April to 12 May 1964 STAT

General: Effort on this project is still concentrated on production, but emphasis has shifted to electrical assembly and optical alignment. Both mechanical technicians assigned to this project are spending most of their time assisting the electrical and optical groups. First enlargements from a negative were made (using the auxiliary source).

It is still anticipated that the original delivery date will be met but this depends, at this point, on not running into any unexpected difficulties.

Items of Interest: Mechanical assembly has been completed except for a few minor items that will be done when the film transport assembly is mated to the main structure. All sheet metal covers have been fitted and painted.

Electrical activity now accounts for six people full time and others part time. Their efforts are centered on 1) design and assembly of servo amplifiers for the film transport system, 2) wiring of the film transport system, 3) wiring of the control panel, 4) wiring of the electrical equipment rack and the main structure. The design of the servo amplifiers was complicated by the fact that the motors as received were different from the description in the literature. A redesign was necessary and has been accomplished. Wiring is proceeding very rapidly but a great deal remains to be done.

Optical alignment of the laser and auxiliary systems can be considered complete, subject to correction as found necessary by photographic tests. The first enlargements were of a half tone target and were uniform over the exposed field.

During the coming month assembly will be completed and most of the check-out tests performed. The customer will visit during the check-out phase to gain familiarity with the operation of the instrument.

[redacted] STAT

LC:lc

STAT

Will visit [redacted] on 27 & 28 May to review progress.

LPX.